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## PUP JOINT WITH INTEGRAL WING NUT RETENTION SHOULDER

This application is a continuation, of application Ser. No. 651,646, filed May 22, 1996 now abandoned.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a pup joint and, more particularly, to a pup joint which includes means for maintaining the wing nut and retainer segments in a position adjacent the male sub at all times.

#### 2. Description of Related Art

Pup joints are relatively small lengths of pipe used in the oilfield industry to conduct fluids from one piece of equipment to another. Typical pup joints comprise a length of pipe having a male sub located at one end, a female sub located at the other end and a wing nut for connecting the male end of one pup joint to the female end of another pup joint. The male sub includes a spherical sealing surface, and the female sub includes a mating conical sealing surface and a set of external threads. The wing nut is retained on the pup joint by means of a shoulder or a set of retainer segments and engages the threads of the female sub to secure two pup joints together.

Maintaining the wing nut and retainer segments adjacent the male sub end has been somewhat of a challenge in prior art pup joints. In certain prior art pup joints constructed of heavy-wall tubing, the wing nut and retainer segments are held in place by means of an interference fit with the male sub tubing. In lighter weight pup joints, however, this interference fit does not exist. Therefore, when a pup joint is held in a non-horizontal position, the wing nut is permitted to slide down the pup joint, thus creating difficulties during installation.

### SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a pup joint which includes means for maintaining the wing nut and retainer segments adjacent the male sub.

According to the present invention, this and other objects and advantages are achieved by providing a pup joint comprising a length of pipe, a female sub integral with one end of the pipe and having external threads formed thereon, a male sub integral with the other end of the pipe, a wing nut for threadedly connecting the male sub to the female sub, a set of retainer segments for retaining the wing nut on the pup joint, and a retention shoulder extending radially outwardly from the male sub to maintain the wing nut and retainer segments on the male sub. In a preferred embodiment of the invention, the pipe and the male and female subs are comprised of a single forging, and the retention shoulder is formed by machining the male sub. The retention shoulder therefore provides a means for preventing the wing nut and retainer segments from sliding down the pup joint.

These and other objects and advantages of the present invention will be made apparent from the following detailed description, with reference to the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation of one embodiment of a prior art pup joint;

FIG. 2 is a front elevation of another embodiment of a prior art pup joint;

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FIG. 3 is a perspective view of a portion of the pup joint of the present invention

FIG. 4 is a partial front elevation of the pup joint of the present invention; and

FIG. 5 is a perspective view of a forging used to construct a pup joint according to one embodiment of the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, a prior art pup joint 10 is shown which comprises a length of pipe 12, an integrally formed male sub 14 at one end of pipe 12 and an integrally formed female sub 16 at the other end of pipe 12. Male sub 14 includes a spherical sealing surface 18, while female sub 16 includes a mating conical sealing surface 20. Female sub 16 also includes a set of threads 22 formed on an exterior surface thereof, and pup joint 10 further comprises a wing nut 24 having a set of internal threads 26 formed therein for engaging the threads 22 of a female sub 16 of another pup joint 10. Nut 24 is retained on pup joint 10 by means of retainer segments 28, which simultaneously engage a rearward shoulder 30 extending radially inwardly from the interior surface of nut 24 and a forward shoulder 32 extending radially outwardly from the exterior surface of male sub 14 to thereby prevent nut 24 from pulling off of pup joint 10 (to the right in FIG. 1) when nut 24 is threaded onto the female sub of another pup joint. In each of the embodiments described herein, it should be recognized that the pup joint, including the length of pipe and the male and female subs, includes a fluid flow passage extending completely longitudinally therethrough.

Referring to FIG. 2, another prior art pup joint, indicated generally at 34, is shown which comprises a length of pipe 36, a male sub 38 and a female sub 40. In this pup joint, male sub 38 and female sub 40 are threaded onto corresponding ends of pipe 36. Prior to threading male sub 38 onto pipe 36, a wing nut 42 is assembled over pipe 36. Wing nut 42 comprises a rearward shoulder 44 extending radially inwardly from an interior surface 46 thereof, and wing nut 42 is retained on pup joint 34 by means of the engagement of rearward shoulder 44 with a forward shoulder 48 of greater diameter than rearward shoulder 44 extending radially outwardly from male sub 38.

Referring to FIG. 3, the pup joint of the present invention, indicated generally at 110, is shown to comprise a length of pipe 112, a male sub 114 located at one end of pipe 112 and a female sub 116 located at the other end of pipe 112. Male sub 114 and female sub 116 may either be formed integral with pipe 112 as a single forging or manufactured individually and then threaded onto the ends of pipe 112. Male sub 114 comprises an enlarged diameter section 118 and a spherical sealing surface 120. Female sub 116 comprises an enlarged diameter section 122 having external threads 124 formed thereon and a conical sealing surface (not shown) adapted to mate with spherical sealing surface 120 of another pup joint 110.

Referring to FIG. 4, pup joint 110 also comprises a wing nut 126 having internal threads 128 designed to engage the threads 124 of another pup joint 110 to thereby secure two pup joints 110 together. Nut 126 is retained on pup joint 110 by means of one or more retainer segments 130. Retainer segments 130 comprise an inner diameter corresponding generally to the outer diameter of enlarged diameter section 118, a front face 132 and a rear face 134. When nut 126 and retainer segments 130 are assembled on male sub 114, front